The European database for subspecialist training in neonatology - transparency achieved

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The European Database for Subspecialist Training in Neonatology – Transparency Achieved

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Key Words
Neonatology · Subspecialist training · Postgraduate medical education · Fellowship · Curriculum · Syllabus · Assessment framework · European Society for Neonatology · Union of European Medical Specialties

Abstract
Background: The European Society for Neonatology (ESN) developed a curriculum for subspecialist training in Europe recommending standards for national neonatal training programmes. We speculate whether these official recommendations are widely accepted or used in practice. ***Objectives:*** To characterize the variation in national neonatal training programmes, to enhance transparency, and to compare them to the ESN Curriculum. ***Methods:*** We constructed a database based on the backbone of the ESN Curriculum: (1) training – knowledge, (2) training – skills, (3) key competencies, (4) personal development, and (5) recording of progress. National neonatal representatives from all 30 member states of the Union of European Medical Specialties (UEMS) provided data on national training programmes. ***Results:*** Although only one country (3%) based its neonatology training entirely on the ESN Curriculum, we found high levels of uniformity among the UEMS member countries regarding knowledge, skills, and key competencies needed to practice neonatology at a tertiary care level. Discrepancy was encountered on ethical and legal issues and on personal development of the trainees. Mentoring and professional evaluation was generally not implemented in the participating countries. ***Conclusions:*** There is an awareness and readiness to focus on educational demands for neonatal trainees. Further discussions about the overall educational goals of neonatal training and the essence of practicing neonatology in each country are needed. The ESN will undertake this process to provide an updated and effective syllabus aimed to harmonize care and outcomes for babies and their families across Europe.

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Introduction

To guide and harmonize the development of national training programmes for neonatal trainees undergoing subspecialist training in tertiary care neonatology, the European Society for Neonatology (ESN) produced the 'European Curriculum and Syllabus for Training in Neonatology' (henceforth: ESN Curriculum) and the 'Assessment Framework for Specialist Trainees in Neonatology' (henceforth: ESN Assessment Framework). These documents describe in detail the recommended standards for national training programmes with respect to content, learning objectives, and personal development. Both documents are accessible on www.esn.espr.info/. They have been ratified by the European Board of Paediatrics (the paediatrics section of the Union of European Medical Specialties (UEMS)) and are endorsed by several European neonatal and perinatal organisations, e.g. the European Union for Perinatal and Neonatal Societies (UENPS).

We speculated whether these official recommendations for subspecialist training in neonatology were followed in Europe.

To enhance transparency about national training programmes and explicitly to compare their content with the ESN Curriculum, we gathered and categorized information from the neonatal societies in Europe. First, we wanted to identify similarities and differences with the aim of further harmonizing neonatal training through national self-reflection on deviations from the majority of participating countries. Second, we intended to identify necessities of adjusting set ESN standards to the 'real life scenario' of neonatology across Europe.

Background

With the foundation of the European Society for Paediatric Research (ESPR) Working Group on Neonatology (WGN) – the predecessor of ESN – in Oslo in 1988, there was an immediate focus on the need to specify minimum training requirements for the accreditation of neonatologists. The work developing a common European curriculum for neonatology was originally a co-project between the European Association of Perinatal Medicine (EAPM) and the ESPR. The first draft version of the ESN Curriculum [1] and the ESN Assessment Framework [2] was originally developed by Michael Obladen and later under Sidarto Bambang Oetomo's guidance accepted by the Confederation of European Specialties (CESP). In 2007 it was rewritten by Neil Marlow. In 2008, Gorm Greisen called for transparency to allow simple comparisons. The ESN board sponsored this process which lasted from March 2010 to September 2011.

The intention of the ESN Curriculum is to support national programmes for subspecialist training in neonatology. It aims specifically at harmonizing training in neonatology by establishing clearly defined standards of knowledge and skills needed to practice neonatology at a tertiary care level.

Table 1 shows the specified key competencies in the ESN Assessment Framework and the three levels each trainee must achieve during subspecialist training.

The additional demands cover key areas of knowledge and experience, reflective notes on each key competence, participation in academic meetings with documented learning outcome, CME-related activities, copies of abstracts and publications produced during subspecialty training, reports of at least three audits, and certification of courses.

Materials and Methods

We constructed a database based on the structure of the ESN Curriculum and categorized information according to five main domains: (1) training – knowledge, (2) training – skills, (3) key competencies, (4) personal development, and (5) recording of progress.

We contacted the national paediatric and/or neonatal societies of all 30 member states of the UEMS (including all 27 members of the European Union (EU) and three non-EU countries – Norway, Iceland and Switzerland) by e-mail and identified primary contact persons (see Acknowledgements). They provided the country-specific data which was registered and verified through a continuous dialogue with the primary investigator.

We also collected information on length of basic paediatric and subspecialist training in neonatology, minimum number of years in a university-based NICU, as well as the total number of NICUs in each country.

Level of agreement with the ESN Curriculum was marked with three colours: 'light grey' indicating total agreement, 'dark grey' partial, and 'black' no agreement (table 2). Basic characteristics were quantified if applicable with nonparametric statistics.

Descriptive statistics were applied to sum up the overall agreement with the ESN Curriculum and finally the database was published on the ESN website [3]. Preliminary results were presented at the ESPR Congress in Newcastle, UK [4].

Results

The response rate was 100%. National consensus was the most commonly used curriculum (67%) for subspecialist training in neonatology. Only one country (3%)

Table 1. Specified key competencies in the ESN Assessment Framework, each divided into three different levels of competence (level III must be completed for each trainee during subspecialty training)

Competence/description	Level I	Level II	Level III
Resuscitation The trainee will be able to institute and lead neonatal resuscitation both of the term and preterm baby. The trainee must have demonstrated a full understanding of the physiology and treatments involved.	Certification of a suitable advanced life support course, which includes the care of the newborn (NLS, PALS, APLS or equivalent). Can demonstrate ability to intubate successfully.	Has advanced resuscitation skills – has knowledge and skills to undertake the technically difficult resuscitation. Has demonstrated team leadership in resuscitation situations.	Able to take full decisions in ethically difficult situations (prematurity, malformation, failed resuscitation) *(essential)*. Reached instructor status on a suitable advanced life support course as above *(desirable)*.
Neurology The trainee will demonstrate proficiency at clinical assessment, investigation (including cerebral ultrasound scanning) and management of a range of neurological disorders, including preterm and term brain injury, congenital malformations, intracranial trauma and seizures.	Able to carry out a structured neurological examination. Can diagnose and initiate first-line management for encephalopathy and seizures.	Can formulate ongoing management plans for common neurological conditions (encephalopathy, seizures, IVH). Able to perform neurological and developmental assessment of the newborn and of babies to 2 years of age.	Can initiate investigation of rare and complex neurological and neuromuscular disorders. Can discuss the use of MRI, CT scanning, EEG in the investigation of neurological disease. Able to perform and interpret a cerebral ultrasound examination *(essential)* and have attended a structured course *(desirable)*.
Communication skills and counselling The trainee will demonstrate increasing skills in communication with parents and staff, both individually and as part of a team, during their training. This includes experience at breaking bad news, handling perinatal death and discussing prognosis with parents.	Can understand and have discussed principles behind counselling and communicating information to parents. Is supportive in team working in neonatal intensive care.	Has had experience of counselling parents anticipating an extremely preterm delivery. Has observed counselling of parents of babies who are dying or are at high risk of disability, the disclosure of antenatal diagnoses or the disclosure of diagnosis of cerebral palsy in outpatients.	Has counselled parents of a baby who is dying or at high risk of disability and requested permission for autopsy. Has led a prenatal counselling session and undertaken bereavement counselling under supervision. Has demonstrated the necessary communication skills to make the concepts and mechanisms of genetic diseases understandable to parents, using non-technical language.
Congenital anomalies and genetic disease The trainee will be able to recognise common congenital anomalies, to investigate babies with such lesions and to use literature and database searches to identify rare conditions and communicate such information to parents.	Able to recognise common syndromes (e.g. trisomy 21, trisomy 18, VACTERL) and has observed counselling of parents by a consultant.	Able to use common texts and genetic/abnormality databases to identify rare disorders. Can obtain a genetic history and understands genetic investigations.	Able to plan diagnostic and clinical management of a baby born with a congenital anomaly with a multidisciplinary team. Has undertaken counselling of parents whose baby has a genetic condition.
Cardiorespiratory intensive care The trainee will be able to institute and maintain full cardiorespiratory intensive care for preterm and sick term newborn babies. This will include a full working knowledge of the principles and application of a range of ventilatory modalities, of circulatory support and the trainee must be able to manage complications. In addition, the trainee must be able to plan care for the baby with chronic respiratory disease and be aware of the potential long-term complications.	Able to institute ventilatory support and administer surfactant. Able to make clinical assessment of adequacy of neonatal circulation and institute support for hypotension. Able to make clinical diagnosis of PDA. Able to diagnose and treat common complications of mechanical ventilation (e.g. pneumothorax, displaced or obstructed tracheal tube). Understands the aetiology and progression of baby with CLD.	Understands and uses different ventilatory modalities. Understands the different pharmacological effects of inotropic drugs and their use. Able to select and monitor appropriate medical or surgical management. Understands the principles of management of the difficult airway (e.g. Pierre Robin anomaly). Understands and able to plan respiratory, nutritional and pharmacological support for CLD.	Supervises whole respiratory course of sick baby with RDS, including weaning from ventilator, use of sedation and muscle relaxants. Able to diagnose and manage complex circulatory problems, including PPHN and cardiac tamponade; understands indications for ECMO. Able to identify patent arterial duct using ultrasound *(desirable)*. Able to manage complex respiratory problems including PIE, subglottic stenosis, pulmonary hypoplasia, chylothorax, diaphragmatic hernia. Able to manage long-term ventilatory support, home oxygen treatment and ongoing outpatient management of babies with CLD.

Table 1 (continued)

Competence/description	Level I	Level II	Level III
Fluid balance, thermoregulation and renal failure The trainee will be able to initiate and manage the thermal environment of preterm and term babies, and manage fluid balance in such babies, demonstrating a full understanding and knowledge of the underlying physiology – with special reference to the rapid postnatal changes in body water distribution and transepidermal water loss. The trainee will be able to diagnose and initiate treatment of renal failure.	Able to institute ventilatory support and administer surfactant.	Able to supervise the entire fluid balance regimen in a complex case, arranging and interpreting the appropriate laboratory investigations.	Able to manage complex fluid balance problems in very preterm babies; able to manage renal failure including deciding when dialysis is indicated.
Haematology and transfusion The trainee will be able to diagnose and manage the range of haematological disorders found in newborn babies. To be conversant with the full range of blood products available for transfusion and the appropriate use of each.	Able to make clinical assessment of adequacy of neonatal circulation and institute support for hypotension.	Can describe and discuss cases of haematological disorders diagnosed and treated by the trainee.	Has experience of management of the range of haematological disorders of babies. Can use blood products appropriately and effectively, including exchange transfusion.
Metabolism and endocrine disorders The trainee will demonstrate proficiency in the recognition, assessment, investigation and management of the more common and important metabolic and endocrine disorders.	Able to make clinical diagnosis and manage common metabolic disturbances including hypoglycaemia, neonatal jaundice and electrolyte abnormalities.	Able to recognise and institute emergency treatment for inborn errors of metabolism and endocrine abnormalities, including recognition, investigation and management of babies with ambiguous genitalia.	Can develop a multidisciplinary management plan for babies with metabolic and endocrine disorders.
Nutrition, feeding and gastrointestinal disease The trainee will understand the importance of neonatal nutrition and be able to provide comprehensive nutritional support to well and sick newborn babies, including the recognition and treatment of common complications.	Able to diagnose and treat common complications of NEC. Understands importance of breast milk. Can establish nutritional support, including intravenous nutrition.	Able to prescribe and manage intravenous nutrition, to be aware of the likely complications of intravenous nutrition and manage problems of feed intolerance. Can manage the medical course of a child with necrotising enterocolitis.	Able to formulate a management plan for nutritional support for a sick newborn baby throughout their clinical course and can discuss the role of early nutrition in determining long-term outcome. Able to manage pre- and postoperative care for a child with congenital gastrointestinal anomalies and those with hepatobiliary disease.
Immunity and infection The trainee will understand the development of immunity and the vulnerability of the newborn to infection.	Understands the aetiology and progression of baby with early and late (nosocomial) onset infections. Able to manage surveillance and preventive measures in infection control.	Has detailed understanding of the mode of action and regimens of antibiotics and of investigation and management of common perinatal and neonatal infections.	Can recognise and manage complex infections such as fungal infections, HIV and intrauterine infection. Understands the multidisciplinary approach and can manage a nursery epidemic.
Family care and care of the well newborn The trainee will have a wide knowledge of normal development, common minor problems and morphological variation and the importance of communication with other healthcare professionals and the parents.	Demonstrates examination of the normal baby including psychosocial aspects and is able to provide parental advice on feeding. Able to manage common neonatal problems, e.g. jaundice, hip dysplasia. Able to discuss the role of neonatal screening tests (PKU, thyroid, hearing) with parents.	Able to teach and supervise midwifes, nurses and doctors providing routine postnatal family support. Able to teach parents basic life support.	Knowledge of legal procedures in child protection, social services, fostering and adoption.

Table 1 (continued)

Competence/description	Level I	Level II	Level III
Ward organization/management skills/clinical governance			
The trainee will have demonstrated skills at leading clinical rounds, be able to carry out the administrative duties required to run a neonatal unit and will have organised and attended perinatal meetings, unit meetings and clinical governance meetings	Has experience of organising duty rotations, annual leave and study leave. Shows an understanding of the issues and importance of clinical governance.	Has organised perinatal and unit meetings. Able to conduct ward rounds and delegate tasks appropriately.	Has attended clinical governance meetings *(essential)* and taken a lead role in such meetings *(desirable)*. Has attended a recognised management course *(essential)*. Has taken part in the investigation of a clinical incident.
Transport of the newborn baby			
The trainee will be competent at retrieval and transport of the sick newborn baby and will be able to teach others to carry out transfers	Has thorough knowledge of equipment used during neonatal transport and of the team approach to transfer/safety aspects. Has been on a neonatal transport as an observer.	Able to perform transfer of sick medical or surgical newborn baby, including ability to deal with emergencies arising during the journey (e.g. extubation, loss of primary oxygen source). Aware of the need to be sensitive to the needs and efforts of the referring hospital.	Able to take full decisions about clinical suitability for transfer and placement of the baby, and to supervise a transfer remotely (e.g. able to provide telephone advice). Assessment of clinical competency of staff to perform transfer.

Fig. 1. Distribution of countries in Europe using ESN (3%), ESN + national consensus (10%), no national consensus (20%), and national consensus only (67%) for subspecialist training in neonatology.

(Cyprus) based its training entirely on the ESN Curriculum. Three countries (10%) (Denmark, Ireland, and Slovakia) combined the ESN Curriculum with their national consensus. Six countries (20%) (Estonia, Iceland, Luxembourg, Norway, Portugal, and Slovenia) did not have any national consensus at all, or only to some extent (fig. 1).

The participating countries varied markedly (population 0.3–65.3 million), with corresponding differences in the number of university-based NICUs in each country (0–50). In order to illustrate a potential difference between the included countries, we looked at EU member status as the denominator and chose not to include population differences since all UEMS member countries are partners in approving of the Curriculum and have equal votes. Basically we found no significant differences between EU and non-EU member states in their relative concordance, and variations were small and infrequent.

Basic paediatric training preceded subspecialty training in all countries. Length of basic training, however, varied with a median (range) of 5 (2–6) years. Similarly, length of subspecialty training in neonatology was 2 (1–6) years. Though in two countries the basic paediatric trunk and the subspecialty training could be accomplished within 4 years, duration of specialty and subspecialty training in our cohort was 7 (4–9) years. Service in a university-based NICU was 1 (0–4) years. Of the three

Table 2. Registration of the training skills needed to practice neonatology at a tertiary care level in Europe, as published on the ESN website

Extensive skills	ESN	Yes %	No %	Yes/no %	EU %	Non-EU %	AUT	BEL	BUL	CH	CYP	CZE	DEU	DNK	ESP	EST	FIN	FRA	GRE	HUN	ICE	IRL	ITA	LAT	LTU	LUX	MLT	NLD	NOR	POL	POR	ROU	SLO	SVK	SWE	UK
Practical procedures		**94**	**3**	**3**	**95**	**95**																															
Resuscitation of the newborn		100	0	0	100	100																														
Tracheal intubation		97	0	3	96	100																														
Artificial ventilation		100	0	0	100	100																														
Arterial catheters		100	0	0	100	100																														
Intravenous infusion		97	3	0	96	100																														
Long intravenous lines		87	3	10	89	68																														
Blood transfusion		100	0	0	100	100																														
Exchange transfusion		97	0	3	96	100																														
Arterial puncture		93	3	3	93	100																														
Drainage of pneumothorax		97	0	3	96	100																														
Suprapubic bladder puncture		77	20	3	78	68																														
Lumbar/ventricular puncture		90	0	10	89	100																														
Diagnosis		**87**	**9**	**4**	**87**	**94**																														
Interpreting X-ray		100	0	0	100	100																														
Understand MRI, CT		97	3	0	96	100																														
Interpreting US examination		90	0	10	89	100																														
Laboratory investigation		100	0	0	100	100																														
EEG etc.		50	40	10	48	68																														
Clinical practice		**99**	**1**	**0**	**99**	**100**																														
Examination of the newborn		100	0	0	100	100																														
Deformation/malformation		100	0	0	100	100																														
Assessment of GA		100	0	0	100	100																														
Developmental assessment		97	3	0	96	100																														
Assessment of disability		97	3	0	96	100																														
Communication		**95**	**1**	**4**	**95**	**100**																														
Counselling/communication		97	0	3	96	100																														
Disclosure of bad news		97	0	3	96	100																														
Handling of autopsy reports		97	0	3	96	100																														
Staff and team dynamics		90	3	7	89	100																														
Cooperation and consultation		97	0	3	96	100																														
Technology		**94**	**1**	**5**	**93**	**100**																														
Radiant heaters		93	3	3	93	100																														
Incubators		93	0	7	93	100																														
Ventilators		93	0	7	93	100																														
Monitoring equipment		97	0	3	93	100																														
Teaching		**90**	**10**	**0**	**89**	**100**																														
Teaching activities		90	10	0	89	100																														
Teaching programs		90	10	0	89	100																														

Total agreement with the ESN Curriculum.

Partial agreement with the ESN Curriculum.

No agreement with the ESN Curriculum.

countries that did not have any university-based NICUs, two out of three (67%) sent their neonatal trainees abroad for 0.5–1 year of service.

Overall we saw a high degree of uniformity among countries and agreement with the ESN Curriculum on several areas of expertise. A particular high agreement (97%) was encountered on the need for comprehensive knowledge on epidemiology, pathology and pathophysiology of the fetus, premature and mature infant, on pharmacology, neonatal care, and follow-up of high-risk infants. Knowledge about ethical and legal issues was accepted by 90% as part of the training.

There was also a high level of agreement (93%) concerning skills within practical procedures, diagnosis, clinical practice, communication, teaching, and technology, though only 20% included suprapubic aspiration of urine. Even more diverse, interpreting EEG tracings, cortical evoked responses and neuromuscular electrophysiological tests were deemed necessary diagnostic skills in only 50% of countries.

94% agreed upon the need for most key competencies. Discrepancy existed on communication skills and counselling. In most countries (90%) communication, disclosing bad news, handling perinatal death, and discussing prognosis with parents were key competencies for a trained neonatologist. Still, 10% either partially or completely disagreed. With respect toward organization, management skills, and clinical governance, overall agreement with the ESN Curriculum was 70%. While 80% of national curriculums included the competence of leading clinical rounds, 70% identified the need for organizing and attending perinatal meetings, unit meetings, and clinical governance meetings; only 60% incorporated administrative duties to run a neonatal unit.

Neonatal trainees are taught how to retrieve and transport newborns in 80% of the countries, and in 67% the trainee is expected to teach others how to carry them out.

The ESN Curriculum recommends that trainees develop special expertise in one or more areas relevant to their practice in neonatology, such as perioperative care, fetal medicine, clinical genetics, and ability to perform developmental assessments. Overall, 77% complied with this recommendation.

Significant differences were discovered in terms of personal development during subspecialist training. Personal skills and competencies needed to fulfil the leadership role within the clinical team, unit or hospital, such as being a counsellor, manager, leader, teacher, being capable of conducting clinical governance and audits, and having statistical and interpretative skills, were agreed upon by only 67% of the participating countries. Personal development within management, leadership, and clinical governance had the lowest scores (50, 53 and 63%, respectively).

Recording of progress was also not well developed in the curriculums of all countries. Trainees are encouraged to keep track of their development in a log book including an assessment framework to record their individual progress. This log book should, amongst other items, contain evidence of attendance at academic meetings and research activities. The overall coherence with the ESN Curriculum on recording of academic and research activities was around 55%, but varied from 23 to 80%, the lowest being on reports of audits.

The log book should also contain reflective notes covering each of the predefined key competencies. Reflective notes have been introduced to stimulate the neonatal trainee to broaden his/her knowledge by self-reflection, based on a single case to be discussed with their individual supervisor. A little more than half (57%) of the included countries had adapted this into their national training programmes.

Finally, the ESN Curriculum recommends that each trainee is allocated to a mentor, responsible for assessing and recording the competence level of the trainee. Although mentoring and professional assessment are being valued higher than a structured examination, only 47% (14/30) of the countries had implemented this structure. Of the remaining 53% (16/30), half of them (8/16) conducted examinations/confrontations of the trainee as part of the subspecialist approval.

Discussion

Though only a very limited number of countries followed the ESN Curriculum in practice (one country completely, three countries partly), all seemed to agree upon the essence of educational demands to neonatal trainees. We found a high level of uniformity on knowledge, skills, and key competencies needed to practice neonatology at a tertiary care level. This is not surprising since medical care of extremely preterm infants and sick newborns is essentially the same across Europe [5–7]. The lack of coherence with the ESN Curriculum on specific skills (EEG, suprapubic bladder puncture, etc.) suggests that these competencies may not be deemed essential or are the responsibility of other dedicated staff.

Of interest is the discrepancy from the ESN Curriculum on ethical and legal issues. Further, there is great

variation in emphasis on personal development of the neonatal trainee across Europe. This may represent differences in how these aspects of professional work are formally included in medical training or how they may be utilized during assessment for employment. Difference in cultures, prerequisites, and healthcare systems may also influence the role(s) of medical specialists. Another possible explanation may be related to competition for posts, reflecting in part the size and numbers of neonatal departments in each country.

Though mentoring and professional evaluation of the trainee is highly prioritized by the ESN, it was generally not implemented in the participating countries. Allocation of a senior, more experienced colleague trained in basic rules of mentorship, coaching, and feedback techniques would be applicable at little or no cost at all with a potential high value for each trainee. Also role-modelling and mentoring are essential in medical education, including postgraduate, specialist, and subspecialist training.

This is in line with the common programme requirements from the Accreditation Council for Graduate Medical Education (ACGME) in the United States of America [8] and the Royal Australian College of Physicians (RACP) Advanced Training Programmes in Neonatology in Australia [9].

The high level of agreement between UEMS member states highlights the common understanding of the educational demands to neonatologists, and sustains the necessity of regarding neonatology an independent specialty.

As shown in table 1 each neonatal trainee must accomplish and ultimately complete three levels of competence on key issues during training according to the ESN Curriculum and Assessment Framework. Though not all participating countries follow the ESN guidelines, the vast majority express the same attitude concerning the necessity of practical skills and key competencies. This survey, however, does not provide insight into the explicit national standards or quality control and surveillance systems on how and when these competencies are completed.

Further research and/or the establishment of an ESN on-site inspection agency are needed to obtain transparency on this issue. Overall, this work is only a small step towards providing more insight into neonatal subspecialty training in Europe, and the answers achieved from our survey need to be verified and followed up continuously.

We hope these findings lead to discussions about the educational goals of neonatal training and the very essence of practicing neonatology in each country. Is a neonatologist primarily a skilled healthcare professional capable of handling and treating neonatal patients with the challenges of instrumentation and medication, or is he/she also expected to handle holistic aspects of care, i.e. moral and ethical issues, taking into account the whole family, the society and medicolegal and economical issues? Furthermore, the health system will determine to what extent management and leadership is part of the neonatal subspecialist training programme. These challenges indicate the need for discussion across the neonatal specialty in Europe, for cooperation and exchange of information and experiences. Within the existing framework of the ESN, we wish to provide an updated and effective European syllabus which harmonizes care and outcomes for babies and their families.

Apart from the data collection, this initiative has given insights into the awareness and readiness of the European countries to focus on educational demands for neonatal trainees. We achieved inclusion of data from all UEMS members, despite anxiety of exposing deficiencies. It reveals a Europe-wide interest in changing and adapting operational standards of care, and in developing a professional, international relationship.

Training programmes in medical disciplines are continuously updated and renewed. Neonatology is a rapidly developing paediatric specialty, and new aspects of diagnosis, therapy and care need to be incorporated in the ESN Curriculum. The transparency achieved by our survey may prompt each country to reflect on their national training programmes, and contribute actively to the next edition of the ESN Curriculum. Thus, we believe this is a significant step towards harmonization and acceptance of high-quality neonatal training across Europe.

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Contributors

Gorm Greisen initiated the work which was funded by a grant from ESPR. Morten Breindahl constructed the database, identified contact persons in every UEMS member country, established and maintained this network. He was in charge of the data sampling, registration and verification and made the first draft of this article. The ESN Board and the ESN Advisory Board supervised the project, reviewed and approved the article.

Disclosure Statement

The authors have no conflicts of interest to disclose.

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